Lesson 2

Llama in the Andes

Born In the Shadow of Mountains

Lesson 1 introduced how landforms, climate, and the availability and use of resources influenced the growth of cities. In this lesson, students build a deeper understanding of these concepts and their influence on the Aztec, Maya, and Inca by learning about the physical geography of Latin America.

The teacher will display photographs of dramatic landform features of Latin America. Students will review background information that provides descriptions and the locations of various Latin American landforms and water resources. Each student will use this information to create a base map that illustrates major physical features of Mexico, Central America, and South America.

By the end of this lesson students will be able to locate Mexico, Central America, and South America and identify the location of major landforms in the region. As students apply this geographical knowledge to their maps, they will create the foundation of knowledge for future lessons dealing with the natural and cultural systems detailed later in the unit.

Learning Objective

Use a map to identify the locations of Mexico, Central America, and South America and identify the location of major landforms in the region.

Background

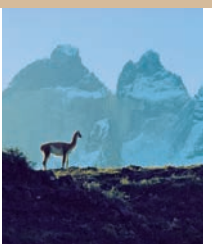
The greatest civilizations of the Americas arose from the shadow of mountains. According to legend, Spanish explorer Hernán Cortés, when asked to describe Mexico to the Spanish court, laid before the king a crumpled piece of paper, a testament to the peaks and valleys of the rugged terrain. In Meso-America and the Andes, diverse geology formed the foundation of the biological, climatic, and cultural diversity that developed.

The story of these mountains begins with the collision of the Nazca, North American, South American, and Caribbean plates. At these tectonic plate boundaries, folding, faulting, and uplift drove the landscape skyward, creating some of the steepest peaks on Earth. Simultaneously, rock plunged underground, melting and rising to form numerous volcanoes.

As these processes built this rugged terrain, a rich diversity of rocks and minerals formed as a result of heat, pressure, and the mixing of elements in Earth's crust. These formations made available to people important goods, including sharp volcanic obsidian glass, metamorphic gems such as jade and turquoise, and seams of gold, silver, and copper.

This region also has some of the world's richest agricultural land. Many areas within this region have mineral-rich volcanic soils that support the intensive cultivation of corn and other crops. Even cleared rainforest can be cultivated where the uplifted limestone of the Yucatán Peninsula neutralizes the acid resulting from tropical decomposition.

Lake Titicaca



In addition to goods, many ecosystem services develop from this dramatic topography. High mountains drive humid air upward, causing it to cool and condensing moisture into rain. The pot-marked limestone shelf of the Yucatán Peninsula purifies water that can be accessed in numerous sinkholes (cenotes). High peaks surround valleys that collected water in numerous large inland lakes, notably Texcoco (where the Aztecs built their capital city) and Titicaca (the heartland of early Inca civilization). Both of these lakes collect rich soil and water in fertile basins that support intensive agriculture.

The diverse topography, geology, and soils that underlie Latin America formed a foundation not just for the region's biological diversity, but for the incredible cultures that grew there.

Key Vocabulary

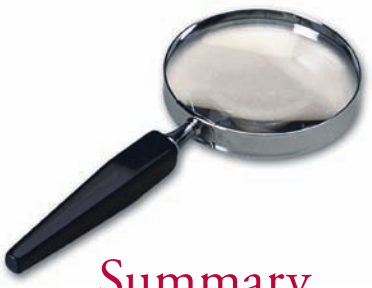
Cenote: A sinkhole or natural well in the limestone bedrock that facilitated access to the water table by the Maya.

Ecosystem Services: Functions and processes in natural systems that are essential to humans, our economies, and cultures.

Goods: Tangible materials important to human economies and cultures. (*Note: goods may or may not be the result of natural processes.)*

Obsidian: A volcanic glass that can be used to make sharp knives and other tools.

Toolbox



Summary of Activities

Students identify and locate Mexico, Central America, and South America. They create a map that outlines some distinctive features of the region using a set of cards that provides the locations of important resources associated with the features.

Instructional Support

See Extensions & Unit Resources, pages 32–33

Prerequisite Knowledge

Students should know about:

- the ways basic geologic processes such as continental drift and tectonic plate movement contribute to the creation of landforms through folding, faulting, and uplift.

Students should be able to:

- read a basic map.
- create a map key.

Advanced Preparation

Gather and prepare Activity Masters.

Gather and prepare Materials Needed.

Gather and prepare Visual Aids:

- Prepare transparencies.

Materials Needed

Activity supplies:

- One set of colored pencils or markers for each group of four students

A-V equipment:

- Overhead or LCD projector, screen

Class supplies:

- Transparency markers

Visual Aids

Photo Cards:

- **Aconcagua Peak and Amazon Basin,** Visual Aid #1
- **Atacama Desert and Belize Barrier Reef,** Visual Aid #2
- **Popocatepetl Volcano, Mexico and Lake Titicaca**, Visual Aid #3
- **Altiplano**, Visual Aid #4

Transparencies:

- **Altiplano Fact Card,** Visual Aid #5
- **Political Boundaries of Latin America**, Visual Aid #6
- **Mexico, Central America, and South America**, Visual Aid #7
- **Satellite Image of Latin America,** Visual Aid #8
- **Tectonic Plate Boundaries of Latin America**, Visual Aid #9

Duration

Preparation Time

15 min.

Instructional Time

55 min.

Safety Notes

None

Activity Masters

Mexico, Central America, and South America
SM, Page 22
One per student

Landform Facts
SM, Pages 23–26
One per student

Procedures

Vocabulary Development

Use the **Key Unit Vocabulary** (Lesson 1 Activity Master) to introduce new words to students as appropriate. This vocabulary sheet will be used throughout the unit.

Step 1

Project the transparency of **Political Boundaries of Latin America** (Visual Aid #6). Point out the current location of Mexico, and Central and South America. Introduce the term "landform," a natural feature of a land surface. Call on students to provide examples of landforms. (*Mountains, rivers, deserts, valleys, reefs, seas*)

Step 2

Post the photo cards of some outstanding landform features of Latin America: **Aconcagua Peak**; **Amazon Basin**; **Atacama Desert**; **Belize Barrier Reef**; **Popocatepetl Volcano, Mexico**; **Lake Titicaca**; **Altiplano** (Visual Aids #1–4). These photo cards illustrate some of the most remarkable landforms of Central and South America.

Step 3

Show students the **Satellite Image of Latin America** (Visual Aid #8). Draw student attention to the mountains. Show **Tectonic Plate Boundaries of Latin America** (Visual Aid #9). Ask students if they see a connection between the two maps. (*The mountains occur at plate boundaries.*)

Step 4

Distribute copies of **Mexico, Central America, and South America** (Lesson 2 Activity Master). Have students label these three regions on their individual maps.

Step 5

Distribute **Landform Facts** (Lesson 2 Activity Master). Project and review the transparency of the **Altiplano Fact Card** (Visual Aid #5) to introduce the layout of the fact cards. Tell students that they will use this information to map outstanding landforms. The right side of the fact cards has information about each landform and the left side shows the location of the landform.

Explain that as students read the information on the fact cards they should copy the placement of the landforms onto their map of **Mexico, Central America, and South America**. Project the transparency of the map of **Mexico, Central America, and South America** (Visual Aid #7) and demonstrate the instructions for the students by placing the Altiplano in the correct location on the map.

Step 6

Use the same transparency to show students how to create a key on the bottom left corner of their maps to label the various landform features. Instruct students to draw a key on their maps of **Mexico, Central America, and South America** as you draw one on the transparency. (*Note: Tell them that this map will be one of several that they will create and analyze to see connections between landforms, climate, and resources in this region.*)

Step 7

Have students complete their maps of Latin America by transferring all of the features from the cards to their maps. When they are finished, review the locations of the landform Allow students to correct any misconceptions.

Step 8

Collect student work for assessment. When returned, remind students to place the work in their unit folders.

Lesson Assessment

Description

Lesson 2 teaches the locations of Mexico, Central America, and South America and identifies the location of major landforms in the region. In Steps 4–7 students demonstrate their overall mastery of the lesson learning objective as they transfer the landforms from the fact cards onto their map of **Mexico, Central America, and South America** (Lesson 2 Activity Master) and create a map key identifying each landform.

Suggested Scoring

Use the completed map of **Mexico, Central America, and South America**, on page 56**,** to score student maps.

Score 5 points for accurate placement of 13 features as identified in the map key and the map of Mexico, Central America, and South America. Score 10 points if map key is clear and accurate. Score 10 points for overall neatness and legibility. The total possible point value is 85.

Mexico, Central America, and South America

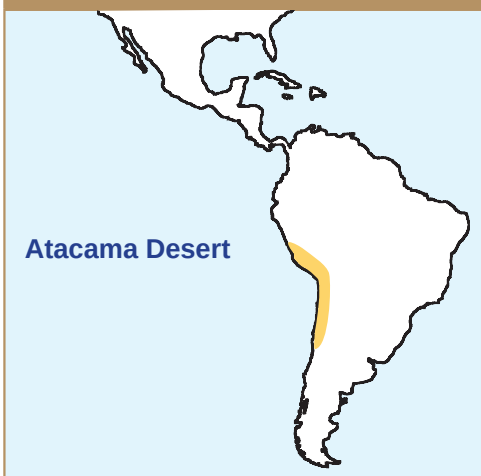
Lesson 2 Activity Master

Name: _____

Landform Facts

Lesson 2 Activity Master | *page 1 of 4*

Landform	Description
 **Altiplano**	This high plateau sits in the central Andes, at 11,000 feet (3,353 meters) above sea level. This area was once covered by a vast inland lake. It is now covered with dense grassland that holds the fragile soil together with deep roots. The grass turns the bright, high-altitude sunshine into energy. Animals such as llamas and alpacas, which produce highly valued meat and wool, eat this grass.
 **Amazon Basin**	The tributaries of the vast Amazon River run down the eastern side of the Andes. They gather into large rivers that flow slowly across the flat land toward the Atlantic Ocean. Here, the largest rainforest on earth covers almost 2 million square miles. Many plants and animals such as orchids, monkeys, jaguars, tropical birds, and butterflies live here. The Amazon lowlands slow the flow of water running off from the Andes. This change of pace allows the water to slowly meander toward the Atlantic, distributing nutrients throughout the forest.
 **Andes Mountains**	The peaks of the Andes rise sharply along the edge of western South America. These mountains reach higher than 22,000 feet (6,706 meters). The Andes are dotted with volcanoes with rich soils and valleys with mild climates. The mountains also have many gold and silver deposits. The peaks of the Andes push air upward, cooling it. This cool air condenses into rain that flows down the mountains. Air in the high mountains is so cold and dry that foods such as potatoes can be freeze-dried for long-term storage.

Landform	Description
	Bordered by high mountains on one side and ocean on the other, the Atacama is the driest desert in the world. Some places here have gone more than 400 years without any evidence of rainfall. Minerals such as salt and copper are common here. The extremely dry conditions are perfect for preserving things, from foodstuffs to human mummies.
	The Belize Barrier Reef is the second largest coral reef in the world. An incredible variety of organisms live here. They include more than 60 species of coral and more than 300 species of fish. The reef breaks rough ocean currents before they hit the shore. This barrier protects coastal villages from rough water and storm surges. Along the reef, many small islands provide places where ocean water can be evaporated to extract salt. Edible fish and conch that live in the reef can be dried for long-distance transport.
	The clear waters of the Caribbean Sea support some of the most diverse marine communities in the world. These communities include coral reefs, seagrass beds, and mangrove swamps. Fish, brightly colored shells, and coral offer food and other resources for people. The warm water here evaporates into the air. This evaporation increases the rainfall along coasts and powers storms that grow into huge hurricanes.

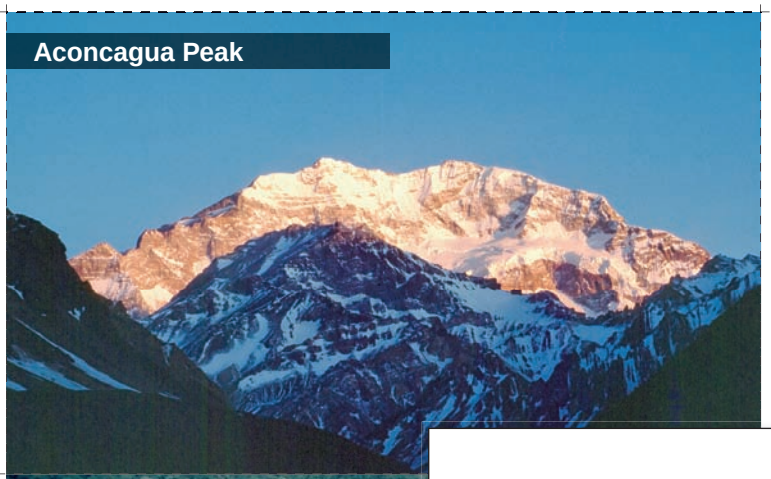
Landform Facts

Lesson 2 Activity Master | *page 3 of 4*

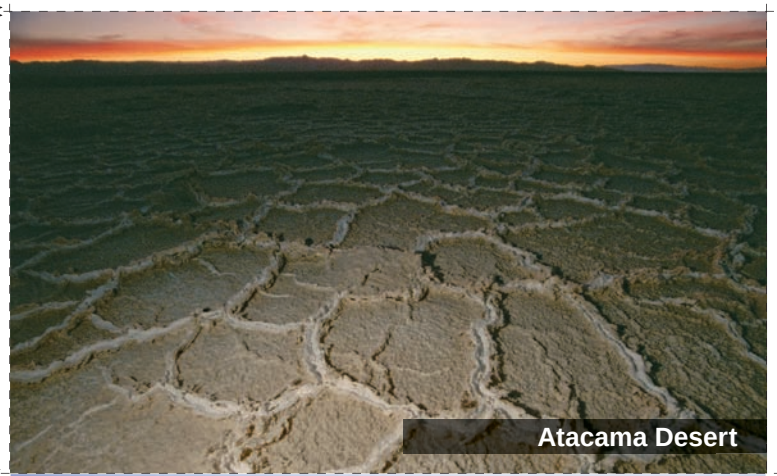
Landform	Description
	The cold Humboldt Current sweeps north from Antarctica along the Pacific coast of South America. Nutrient-rich sediments rise upward in the water offshore through upwelling. This shift in the water layers creates one of the most productive marine systems in the world. Here, people harvest tons of anchovies, sardines, tuna, and other fish.
	This inland lake is formed by a number of rivers that flow into a basin surrounded by volcanoes. Vegetation falls into the lake and rots at the bottom, adding nutrients to the soil. Rich sediment and a permanent supply of water make it an ideal location for agriculture. People created raised gardens called *chinampas* in shallow parts of the lake. Much of Mexico City sits on the drained and filled remains of Lake Texcoco; however, some areas continue to be agriculturally productive, including the chinampa gardens of Xochimilco.
	Lake Titicaca is one of the highest lakes in the world. It is fed by water from numerous mountain streams that carry rich soil from surrounding volcanic peaks. Lake Titicaca provides a source of fresh water in the dry Altiplano. Reeds that grow in the lake are so thick that people make them into artificial islands, upon which they still build whole villages.

Landform	Description
	This valley is located where the Caribbean and North American tectonic plates meet. It is the only place in the Americas where the valuable gemstone jade occurs. This hard green stone was polished into jewelry, masks, and important ceremonial objects. Water from the highlands of Guatemala ran through this valley in permanent rivers. These watered crops, brought rich volcanic soils to the lowlands, and provided travel routes for trade.
	The peaks of the Sierra Madre support some of the richest and most diverse natural systems in the world. A high valley divides these peaks into two ranges. The Sierra Madre Occidental is on the west. The Sierra Madre Oriental is to the east. These volcanic mountains help to push air upward over Mexico. This effect on air pressure creates rain that sustains lush vegetation toward the southern part of the range. Active volcanoes shower nutrient-rich ash on valleys below, building some of most productive soils in the world. The hard mountains reach beneath the soft soil, creating aquifers that come to the surface as freshwater springs.
	This flat area was once seafloor and is made of limestone. The limestone neutralizes acid from plant decomposition in the forest, resulting in unusually rich tropical soils. Limestone erodes easily, forming wells called cenotes that provide access to fresh water. Limestone provides an important building material for people. It can be carved into large blocks and burned to make cement. Burnt limestone added to cornmeal keeps tortillas soft and flexible.

1 Aconcagua Peak and Amazon Basin
Visual Aid — Photo Cards



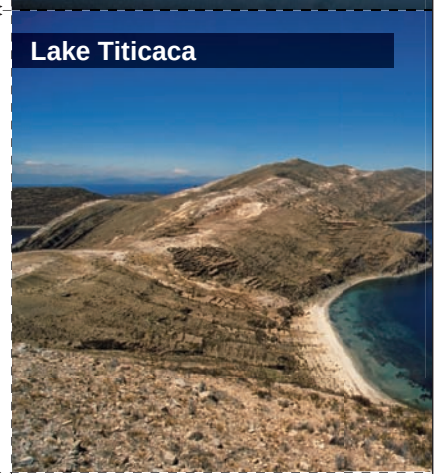
2 Atacama Desert and Belize Barrier Reef
Visual Aid — Photo Cards



3 **Popocatepetl Volcano and Lake Titicaca**
Visual Aid — Photo Cards

Popocatepetl Volcano

Lake Titicaca



4 **Altiplano**
Visual Aid — Photo Cards

Altiplano

5 **Altiplano Fact Card**
Visual Aid — Transparency

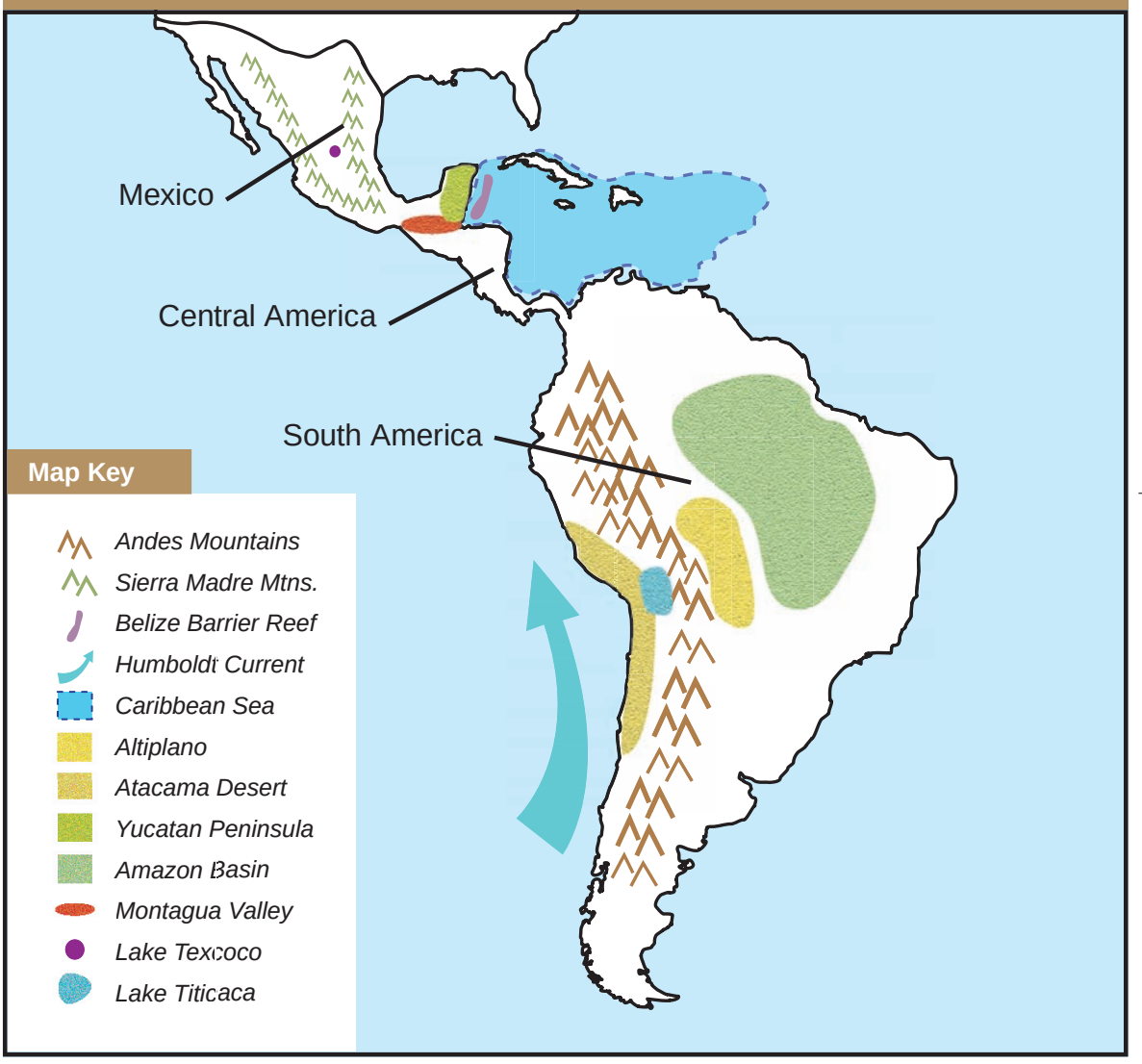
Altiplano Fact Card

Landform	Description
	This high plateau sits in the central Andes, at 11,000 feet (3,353 meters) above sea level. This area was once covered by a vast inland lake. It is now covered with dense grassland that holds the fragile soil together with deep roots. The grass turns the bright, high-altitude sunshine into energy. Animals such as llamas and alpacas, which produce highly valued meat and wool, eat this grass.

Political Boundaries of Latin America

7 **Mexico, Central America, and South America**
Visual Aid — Transparency

Mexico, Central America, and South America



8 **Satellite Iimage of Latin America**
Visual Aid — Transparency

Satellite Image of Latin America

9 **Tectonic Plate Boundaries of Latin America**
Visual Aid — Transparency